CLAIMS

What is claimed is:

5   1.   An x-ray assembly for determining bone mineral density comprising

an x-ray film holder

x-ray film and

a wedge-shaped calibration phantom having length (L) and varying

thickness (T) along the length.

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2.   The assembly according to claim 1, wherein the calibration phantom

projects free of bone tissue.

3.   The assembly of claim 1, wherein the calibration phantom is attached to

15   the x-ray film holder or a detector system.

4.   The assembly of claim 1, wherein the calibration phantom is integral to

the x-ray film holder.

20   5.   The assembly of claim 1, wherein the x-ray assembly is a dental x-ray

assembly.

6. The assembly of claim 1, wherein the thickness of the calibration phantom

varies linearly along the length.

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7. The assembly of claim 1, wherein the thickness of the calibration phantom

varies non-linearly along the length.

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8. A method of generating a density calibration curve, comprising the steps of

(a) providing an assembly according to claim 1 to produce an x-ray image of an anatomical structure;

5 (b) measuring attenuation at a multitude of points in the x-ray image of the calibration phantom, wherein each point is at known distance from a selected part of the phantom, thereby generating a calibration curve that describes the relationship between measured attenuation and material thickness.

10 9. A method of generating a density calibration curve, comprising the steps of

(a) providing an assembly according to claim 7 to produce an x-ray image of an anatomical structure;

(b) generating an expected calibration curve; and

(c) measuring attenuation at a multitude of points in the x-ray image of the

15 calibration phantom; and

(d) aligning the points measured in step (c) with the expected calibration curve generated in step (b), thereby generating a calibration curve for the image.

10. The method of claim 8, further comprising the step of translating the

20 calibration curve describing thickness into a curve describing calcium concentration.

11. The method of claim 10, wherein the calibration phantom comprises aluminum and the calibration curve describes aluminum thickness.

25 12. The method of claim 9, further comprising the step of translating the calibration curve describing thickness into a curve describing calcium concentration.

13. The method of claim 12, wherein the calibration phantom comprises aluminum and the calibration curve describes aluminum thickness.

14. A method of generating a reference calibration curve, comprising the step of calculating the average of calibration curves obtained according to the method of claim 8.

5   15. A method of generating a reference calibration curve, comprising the step of calculating the average of calibration curves obtained according to the method of claim 9.

16. A method of generating a density calibration curve, comprising the steps of

(a) generating a digital x-ray image of an anatomic structure that includes a

10   wedge-shaped calibration phantom having length (L) and varying thickness (T) along the length;

(b) generating an expected calibration curve; and

(c) measuring attenuation at a multitude of points in the x-ray image of the calibration phantom; and

15   (d) aligning the points measured in step (c) with the expected calibration curve generated in step (b), thereby generating a calibration curve for the image.

17. The method of claim 16, further comprising the step of translating the calibration curve describing thickness into a curve describing calcium concentration.

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18. The method of claim 17, wherein the calibration phantom comprises aluminum and the calibration curve describes aluminum thickness.

19. A method of determining bone mineral density of an x-ray image, the method

25   comprising:

(a) generating a calibration curve according to the method of claim 8, and

(b) comparing attenuation information obtained from the image the subject's anatomy to the calibration curve, thereby determining bone mineral density of the subject.

20. A method of determining bone mineral density of an x-ray image, the method comprising:

(a) generating a calibration curve according to the method of claim 9, and

(b) comparing attenuation information obtained from the image of the subject's anatomy to the calibration curve, thereby determining bone mineral density of the subject.

21. A method of determining bone mineral density of an x-ray image, the method comprising:

(a) generating a calibration curve according to the method of claim 10, and

(b) comparing attenuation information obtained from the image the subject's anatomy to the calcium concentration calibration curve, thereby determining bone mineral density or bone structure of the subject.

22. A method of determining bone mineral density of an x-ray image, the method comprising:

(a) generating a calibration curve according to the method of claim 12, and

(b) comparing attenuation information obtained from the image the subject's anatomy to the calcium concentration calibration curve, thereby determining bone mineral density or bone structure of the subject.

23. A method of determining bone mineral density of an x-ray image, the method comprising:

(a) generating a reference calibration curve according to the method of claim 14, and

(b) comparing attenuation information obtained from the image the subject's anatomy to the reference calibration curve, thereby determining bone mineral density or bone structure of the subject.

24. A method of determining bone mineral density of an x-ray image, the method comprising:

(a) generating a reference calibration curve according to the method of claim 15,

5   and

(b) comparing attenuation information obtained from the image the subject's anatomy to the reference calibration curve, thereby determining bone mineral density or bone structure of the subject.

10   25.   The method of claim 8, wherein the x-ray image is a dental x-ray.

26.   The method of claim 8, wherein said comparing is performed in a network environment.

15   27.   A kit comprising a wedge calibration phantom, an x-ray imaging assembly and computer programs, wherein said computer programs analyze and assess bone mineral density.

28.   A method of diagnosing osteoporosis comprising analyzing an x-ray

20   obtained by the method of claim 1.

29.   A method of treating osteoporosis comprising diagnosing osteoporosis according to the method of claim 28 and administering a suitable treatment.

25   30. The method of claim 29, wherein the treatment comprises administering an anti-resorptive agent or an anabolic agent.

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